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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 09/330,417 | 06/11/99 | PAVELCHEK | E 50369 |

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IM22/0104

EXAMINER

KORNAKOV, M

ART UNIT

PAPER NUMBER

1746

DATE MAILED:

01/04/01

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/330,417

Applicant(s)

PAVELCHEK, EDWARD K.

Examiner

Michael Komakov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 21-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claims 21-23 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 June 1999 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 21-23 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non elected invention, and the elected species of inorganic material containing metals of Group IIIa is acknowledged. There being no allowable generic or linking claim. Election was treated as being made **without** traverse in Paper No. 7, since the Applicant did not traverse the restriction/election requirement advanced by the Examiner.

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

3. The drawings filed on 06/11/99 are acceptable subject to correction of the informalities indicated on the attached "Notice of Draftperson's Patent Drawing Review," PTO-948. In order to avoid abandonment of this application, correction is required.

Specification

4. The disclosure is objected to because of the following informalities:

- the recited "geranium" (page 3, line 14) is apparently misspelled term "germanium". Appropriate correction is required.

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- the meaning of recited "...carbon groups..." (page 5, line 26) is not clear. Apparently the term "carbon containing compounds" is more appropriate.
- The recited "...**mole percent**...based on total solids..." (page 6, lines 2, 13) appears to be indefinite, because the instant specification does not provide for the calculation of mole percentage. Based on information, disclosed in the instant specification, the use of **weight percentage**, for example, like presented on page 10, lines 7-12, is appropriate. Clarification and appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2, 3, 13, 18, 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- The recited in claims 2 and 3 "mole percent" of carbon and inorganic atoms, based on total solids of the composition constitute an indefinite subject matter, because it is not clear how the mole percentage of each of the recited ingredients is calculated. The instant specification does not clearly provide the necessary information.

- The recited in claims 13, 18, 19 ratio of reactivity of antireflective hard mask layer and dielectric layer during oxygen plasma etching constitutes an indefinite subject matter, because the comparative determination of the reactivity of each layer under certain conditions is not provided, particular composition of the hard mask and

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particulate nature of the dielectric layer for the same certain conditions are not disclosed. Clarification is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

8. Claims 1-11, 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Pavelchek et al. (U.S. 5,939,236).

Pavelchek provides methods for forming a photoresist relief image on substrates coated with antireflective compositions (hard masks) (col.5, lines 23-25) utilizing the following steps: providing dielectric substrate, such as silicone dioxide (col.14, line 34); depositing by spin coating (col. 14, line 27) a layer of antireflective composition on a substrate (col. 14 lines 27-29), the antireflective composition comprises photoacid generators which may employ halogen complex of divalent to heptavalent metals, for example Al (col.6, lines 46-48), which represents Group IIIa; depositing photoresist over the cured layer of antireflective coating (col. 14, lines 42-43); exposing photoresist to activating radiation (col. 14, lines 63-67) and developing photoresist (col. 15, line 23) to produce a patterned image over antireflective layer; etching areas, bared from photoresist,

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particularly, removing crosslinked antihalation (antireflective) coating layer by oxygen plasma etching and selectively processing bared substrate areas (col. 15, lines 36-42).

Therefore each and every step of the claimed process is anticipated by Pavelchek.

Pavelchek further discloses the use of aromatic polycyclic or heterocyclic compounds with optionally substituted anthracyl, phenanthryl, naphthyl and other groups (col. 7, lines 22-35) and wavelength exposure at 193 nm or 248 nm (col.4, line 62; Examples 3 and 4).

Pavelchek teaches the use of a thermal acid generator as the part of antireflective composition (col. 11, lines 5-8). The mole ratio of carbon containing compound and the metal containing compound of Pavelchek are within the range as instantly claimed.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13, 18 and 19 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pavelchek et al. (U.S.5,939,236).

While teaching a method for forming a photoresist relief image on substrates coated with antireflective layers (hard masks), providing the steps identical to instantly claimed, Pavelchek does not specifically compares the reactivity of antireflective layer and the dielectric layer during the oxygen plasma etching. But, because Pavelchek teaches the

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use of antireflective hard masks and dielectric substrate, which are the same as and are made in essentially the same manner as the ones instantly claimed, one skilled in the art would have expected the reactivity towards etching of applied layers during the oxygen plasma etching the same as instantly claimed, consult *In re Fitzgerald* (205 USPQ 594). (CAFC).

10. Claims 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavelchek et al (U.S. 5,939,236).

While disclosing the process and the antireflective hard mask composition utilized in this process as instantly claimed Pavelchek does not teach the use of plasma halide etching as per instant claims 12 and 20. However, Pavelchek himself provides a clear motivation for use any suitable plasma gas etch in his process (col. 15, line 40-41). Because the antireflective layer of Pavelchek contains aluminum, examiner takes notice that the most appropriate environment for the plasma etching of aluminum layers should comprise chlorine containing gases. Therefore, it would have been found obvious by one skilled in the art at the time the invention was made to utilize chlorine containing plasma for the etching of antireflective layer of Pavelchek and thus to arrive at the claimed subject matter with the reasonable expectation of success.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (703) 305-0400. The examiner can normally be reached on 9:00am - 5:30pm.

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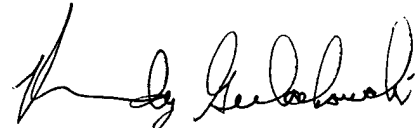
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3599 for regular communications and (703)305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 2450.

Michael Kornakov
Examiner
Art Unit 1746

MK

December 26, 2000



RANDY GULAKOWSKI
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